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(54) **NEEDLE-FREE BLOOD DRAW**

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(57) **ABSTRACT**

A system for needle-free drawing of blood is disclosed. A device can include an evacuated negative-pressure barrel with a membrane sealing an aperture at a distal end, and a housing affixed to a proximal end. An accelerator barrel can be positioned within the negative-pressure barrel and fixed to the housing, with an open proximal end in a chamber in the housing, and an open distal end aligned with the aperture. The chamber can be filled with pressurized gas, and a trigger valve can hydrostatically separate the chamber from the open proximal end of the accelerator barrel. A micro-particle positioned within the accelerator barrel can be accelerated to high speed by an abrupt surge of gas by releasing the trigger valve. The micro-particle can attain enough momentum to pierce the aperture membrane and penetrate adjacent dermal tissue. A resulting micro-emergence of blood can be drawn into the negative pressure barrel.